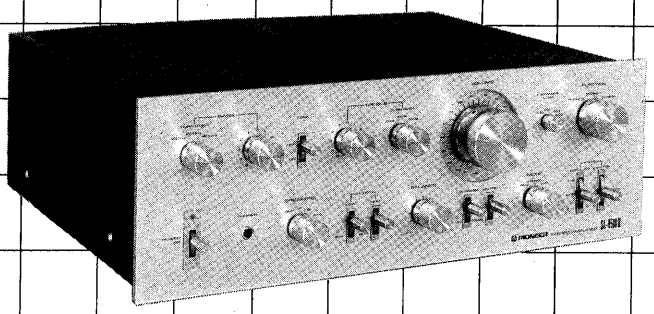
STEREO AMPLIFIER

SA-8500II

OPERATING INSTRUCTIONS

S
HG



SA-8500II are designed to operate 220V or 240V (HG model) main and 110V, 120V, 220V or 240V (S model) main. Before turning on the power, please confirm the line voltage setting indicated on the rear of your unit corresponds to the supply voltage in your area; if not, change the setting as described in IMPORTANT–LINE VOLTAGE on page 16.

PIONEER®

FEATURES

Designed for Power to Spare

Advanced DC stability and high gain are realized in the power amplifier by incorporating a dual plus-minus power supply, a 1st stage differential amplifier and a current mirror type differential amplifier in the predriver stage. Negative feedback is applied in an optimum design for minimized distortion. New type power transistors in the output stage form a parallel push-pull composition in a purely complementary OCL circuit.

Continuous power output is 60 watts* per channel min. RMS, at 8 ohms or 75 watts* per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.1% total harmonic distortion.

Ample reserve power becomes available with low distortion. Chimney type heatsinks are also employed which focus the generated heat to increase thermal dissipating efficiency.

High Stability Twin Transformer Power Supply

Superb regulation and stability are achieved by the massive twin power transformer design that in essence combines two monaural amplifiers to form symmetrical left and right channel amplifiers. The dual plus-minus power supply system also incorporates four large 10,000 microfarad electrolytic capacitors, providing greater stamina in this important section. Low frequency reproduction becomes clear and distinct. The preamplifier section also includes a carefully engineered voltage regulator circuit and balanced positive and negative power supply, assuring low distortion from low to high output levels.

Class A SEPP Equalizer Section

Low noise PNP transistor differential amplifier 1st stage and class A purely complementary SEPP final stage are featured in the three stage direct coupled equalizer circuit. At ±25V power supply voltage, the maximum phono input (at 1kHz) is more than 250mVrms providing plenty of dynamic margin. Stringent standards for the high precision circuit elements contribute to holding the RIAA deviation to within ±0.2dB in the range from 20Hz to 20,000Hz. The extremely flat response enables accurate reproduction of delicate program source material.

Protection/Muting Circuit for both Reliability and Listening Ease

Valuable speaker systems and semiconductors are protected against damage in event of speaker terminal shorting or the appearance of DC current at the output terminals. If these types of malfunctions occur, the relay type protection circuit immediately opens the output circuit, thus preventing further damage. The circuit also performs a muting function to prevent noise bursts when the power switch is operated on-off.

PHONO Input Circuit with Selectable Load Capacitance

An input capacitance switch allows optimum matching of the phono 1 and 2 circuits to the cartridge output characteristics. Various types of responses can also be obtained from a single cartridge by varying the input capacitance with the input capacitance switch to provide differences in playback sound quality.

Selectable Turnover Tone Controls

In addition to the familiar bass and treble controls, turn over switches are provided which can be used to select the point where the tone controls take effect. Precise tone adjustments become possible according to listening room acoustics, phono cartridge and speaker system frequency characteristics and other objectives. Since a tone defeat switch is also included, a flat frequency response can be obtained when desired to allow listening comparisons of various tone control settings.

Convenient DUPLICATE Switch for Tape Dubbing

Two tape decks can be connected and dubbing performed in either direction (from tape 1 to tape 2, or from tape 2 to tape 1). Simple switch selection permits extremely convenient tape duplication and program editing.

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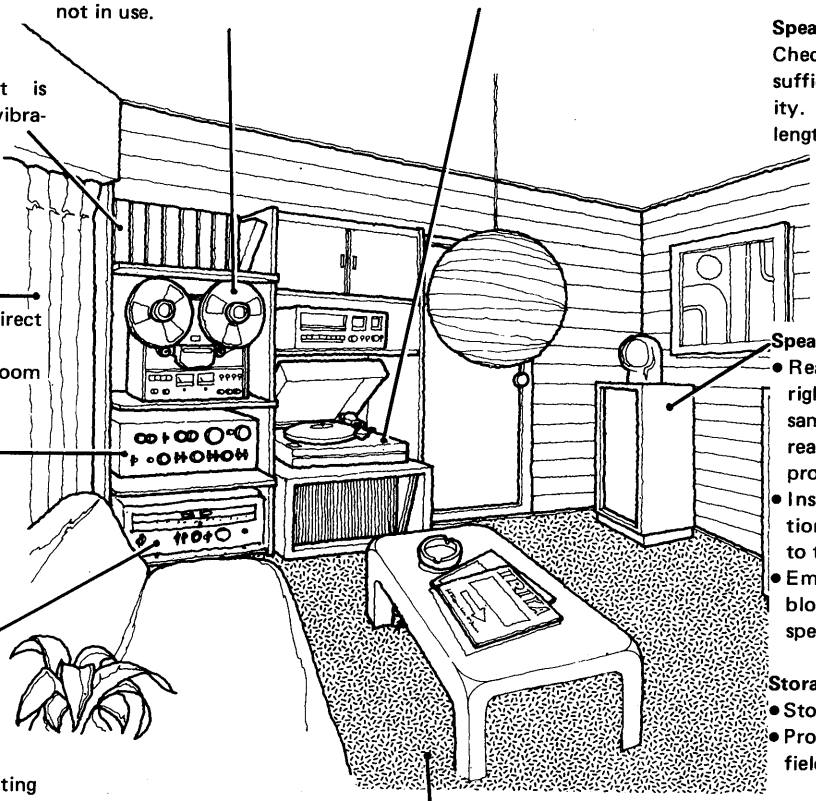
** Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Output Claims for Amplifiers.*

STEREO SYSTEM COMPOSITION



Tape deck
- Be sure to install reel clamps when operating vertically.
- Protect with dust cover when not in use.

Turntable
- Protect from vibrations.
- Keep dust cover closed whenever possible.

Speaker connections
Check that speaker cord has sufficient current handling capacity. Avoid using longer cord lengths than necessary.

Cabinet
- Stable construction that is durable under weight and vibration.

Thick curtains
- Shield equipment from direct sunlight.
- Aid to reduce listening room reflections and resonance.

SA-8500II

Speaker system
- Rear and side panels of left and right speakers should be at the same conditions. (Placing with rear panel against a wall improves bass.)
- Install speakers so that vibrations are not transferred directly to the floor.
- Employ stands or concrete blocks with bookshelf type speakers.

Storage case
- Store records vertically.
- Protect tapes from magnetic fields.

Tuner
- Do not use longer connecting cords than necessary.
- Install antenna in direction providing best reception.
- An outdoor FM antenna is recommended for FM reception.

Carpet
- Improves sound absorption.

- Best listening position is slightly to the rear of the apex of an equilateral triangle formed with the left and right speakers.
- Furniture materials and placement can affect tone.

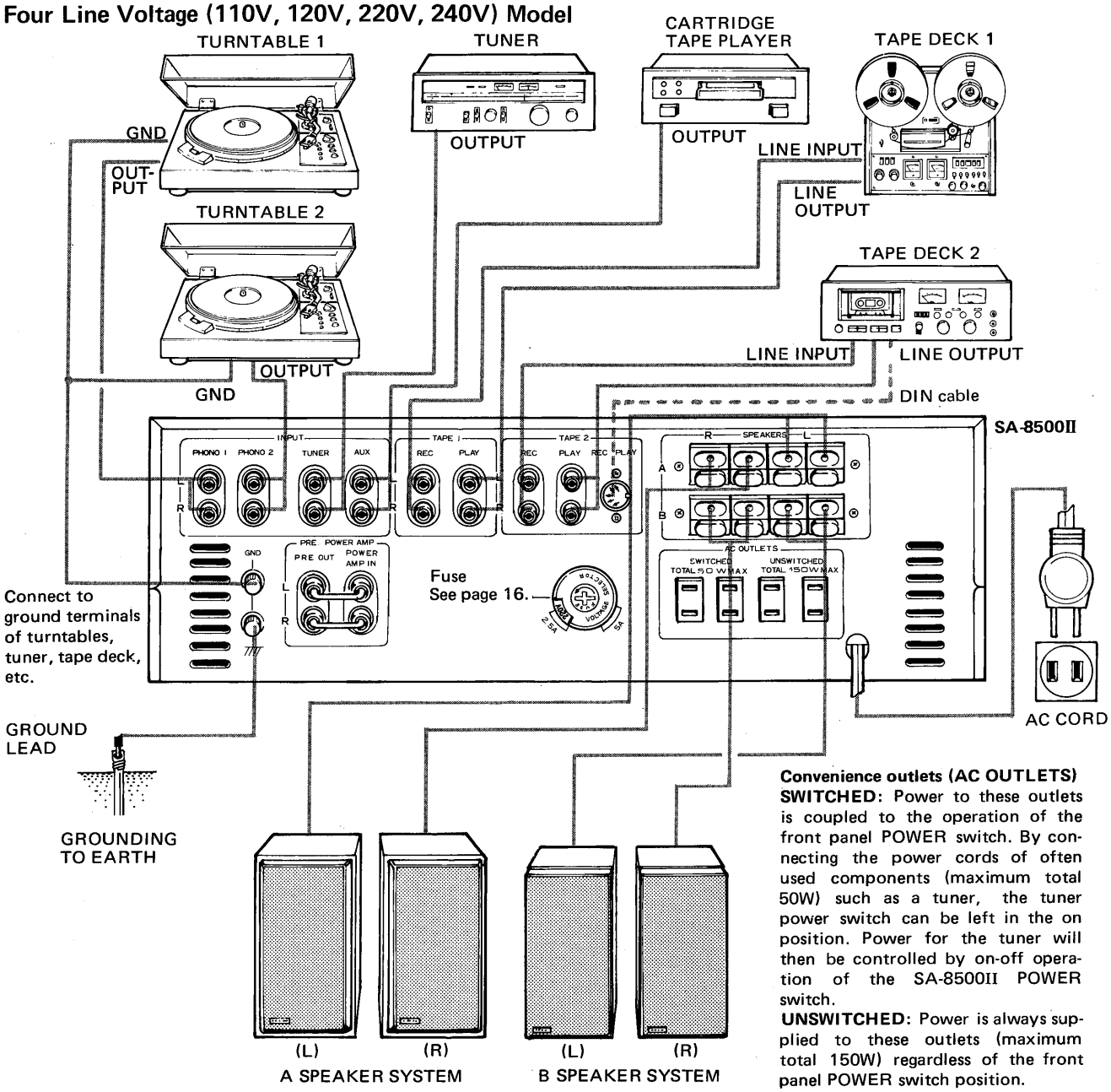
INSTALLATION CAUTIONS

In order to ensure long term top performance, do not install the SA-8500II in locations such as the following:

Locations to be avoided	Detrimental effects
• Direct sunlight, radiators or other sources of heat.	• Accumulated effects of internal and external heat can reduce thermal dissipation efficiency of power amplifier and lead to component deterioration. In some cases heating may also prevent stable operation.
• Poorly ventilated, humid or dusty locations.	• Can cause faulty connection or corrosion of input and output terminals. Humidity and moisture in particular may reduce insulation performance and lead to current leakage or component overheating.
• Unstable supports that are not level or subject to vibration.	• May adversely affect precision circuit components. Weight can also pose a hazard in regions subject to seismic activity.
• Locations where alcohols, insect spray or flammable material is used or stored.	• In addition to fire hazard, some materials may contribute to corrosion or mar finish of equipment.

CONNECTION DIAGRAM

Four Line Voltage (110V, 120V, 220V, 240V) Model

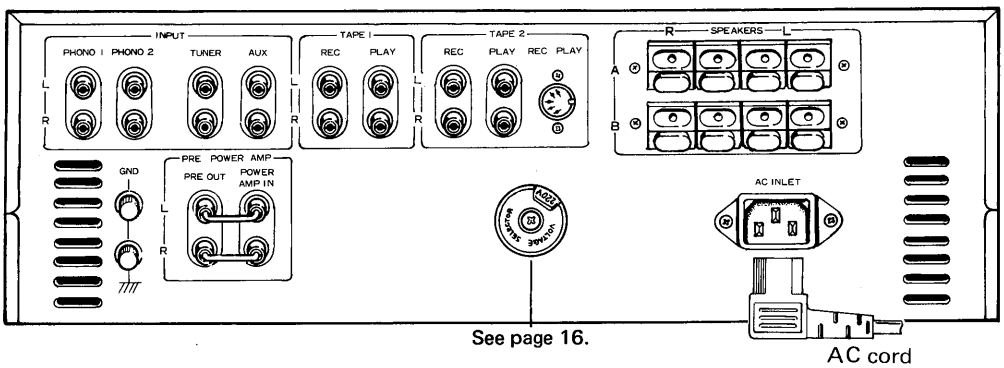


Convenience outlets (AC OUTLETS)

SWITCHED: Power to these outlets is coupled to the operation of the front panel POWER switch. By connecting the power cords of often used components (maximum total 50W) such as a tuner, the tuner power switch can be left in the on position. Power for the tuner will then be controlled by on-off operation of the SA-8500II POWER switch.

UNSWITCHED: Power is always supplied to these outlets (maximum total 150W) regardless of the front panel POWER switch position.

Two Line Voltage (220V, 240V) Model



CONNECTIONS

SPEAKER SYSTEMS

Two sets of stereo speaker systems (A and B) can be connected to the SA-8500II. Normally employ the SPEAKERS A terminals when connecting only one set of speaker systems.

NOTE:
If two sets of speaker systems (A and B) are used simultaneously, be sure that the impedance of each system is 8ohms or greater. Connecting a speaker system of less than 8ohms in this case can cause faulty operation of the protection circuit and prevent normal stereo playback.

As shown in Fig. 1, connect the right channel speaker (as viewed from listening position) to the R terminals and the left channel speaker to the L terminals. Observe plus (+: red) and minus (−: black) polarities of SPEAKERS terminals and the terminals on rear of speaker systems. Be sure to connect plus to plus and minus to minus.

Speaker Cord Connection

1. As shown in Fig. 2, strip about 10mm of the insulation from the end of the speaker cord. If the conductor is stranded, twist the strands together to prevent spreading.
2. While holding the terminal button depressed, insert the end of the cord into the terminal hole.
3. Release the button and confirm that cord is firmly clamped in terminal.

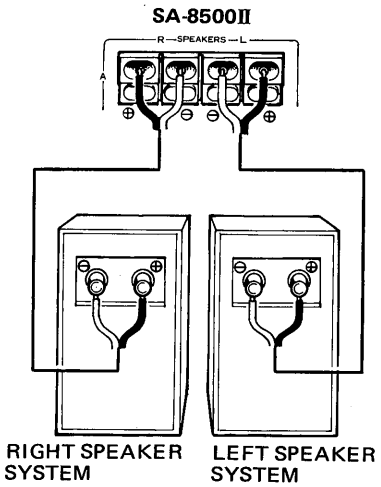


Fig. 1

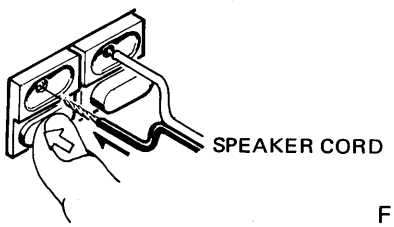


Fig. 2

TURNTABLE

Connect the output cord of a turntable equipped with a moving magnet (MM) type cartridge to the PHONO 1 jacks. If the turntable is provided with a ground lead, connect this lead to the GND terminal on the rear of the SA-8500II.

NOTES:
- *In addition to an MM type cartridge, an induced magnet (IM) type cartridge can be employed. In the case a moving coil (MC) type cartridge, a special boosting transformer or head amplifier becomes required.*
- *A second turntable can be connected to the PHONO 2 jacks.*
- *If the turntable is equipped with two tonearms, connect the output of one cartridge to PHONO 1 and the other to PHONO 2 jacks.*
- *Select turntable installation site carefully. If it is too close to the speakers or subject to vibration, feedback howling can occur, preventing use at high volumes.*

TUNER

Connect the output of an AM/FM stereo tuner to the TUNER jacks.

AUX JACKS

Employ for connecting auxiliary source component. A TV sound tuner, cartridge tape player, second tuner or other source can be connected to these jacks.

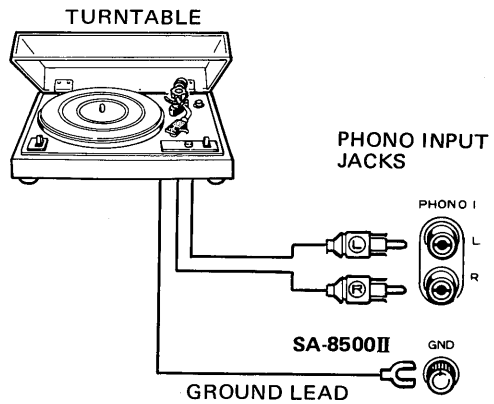


Fig. 3

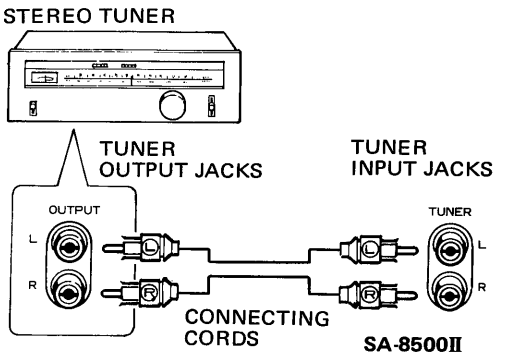


Fig. 4

FRONT PANEL FACILITIES

BASS TURN OVER SWITCH

Selects the frequency below which the BASS control tone adjustments apply. Set switch to 100Hz, 200Hz or 400Hz according to listening room and speaker system characteristics or personal preference.

TONE SWITCH

In the ON position, tone adjustments can be performed with the BASS and TREBLE controls. When set to the upper (OFF) position, the tone control circuits are disengaged and frequency response is flat. This function is convenient for checking phono cartridge and speaker tone quality and listening room acoustics.

POWER SWITCH

Set to ON position to energize SA-8500II. After setting to ON, there is a brief delay before sound is obtained. This is due to the operation of the muting circuit which prevents noise when the POWER is switched. This function does not indicate difficulty and normal operating condition is attained in a few seconds.

PHONES JACK

When listening with stereo headphones, connect them to this jack.

NOTE:
Set SPEAKERS switch to OFF when listening only with headphones.

SPEAKERS SWITCH

Selects speaker system operation.

OFF:	Sound not obtained from speakers (when using headphones).
A:	Sound obtained from speakers connected to A speaker terminals.
B:	Sound obtained from speakers connected to B speakers terminals.
A + B:	Sound obtained from speakers connected to both A and B speaker terminals.

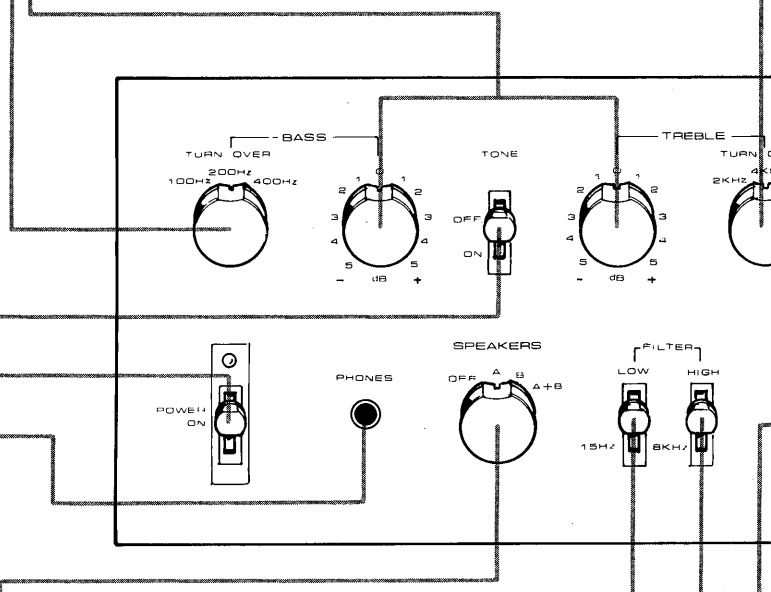
NOTE:
When listening with headphones or to temporarily interrupt the speaker sound, set switch to OFF or to an unused speaker position.

BASS AND TREBLE CONTROLS

Controls for adjusting low and high frequency tones. With the TONE switch set to ON, turning the BASS control clockwise from center enhances the frequency band below the point selected by the BASS TURN OVER switch, while counter-clockwise rotation attenuates this band. In a similar manner, the TREBLE control adjusts the frequency range above the point selected by the TREBLE TURN OVER switch. See additional description under "TURN OVER Switches" on Page 9.

TREBLE TURN OVER SWITCH

Selects the frequency above which the TREBLE control tone adjustments apply. Set to 2kHz, 4kHz or 8kHz according to listening room and speaker system characteristics or personal preference.



LOW FILTER SWITCH

Set to 15Hz position in the event that turntable rumble, recording cutting noise or other low frequency noise becomes objectionable. Attenuation in the frequency band below 15Hz is 6dB/octave.

HIGH FILTER SWITCH

Set to 8kHz position if record scratch noise or other high frequency noise becomes objectionable. Attenuation in the frequency band above 8kHz is 6dB/octave.

BALANCE CONTROL

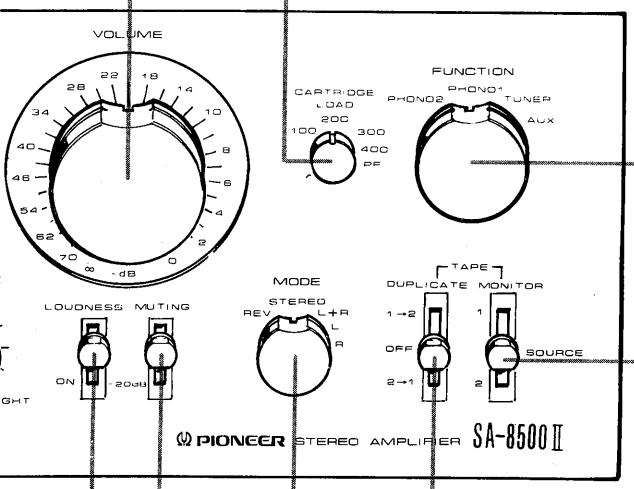
Control for adjusting stereo balance between left and right speaker systems or headphones. Turn clockwise from center to increase right (R) channel volume and counter-clockwise from center to increase left (L) channel volume in order to obtain a balance.

VOLUME CONTROL

Adjusts speaker and headphone volume. Scale indicates attenuation in dB with maximum volume assigned an arbitrary value of 0dB. Control can also be used in combination with the MUTING switch to provide a finer and wider range of adjustment. See further description under the heading "VOLUME Control and MUTING Switch" on Page 10.

CARTRIDGE LOAD SWITCH

Switch for selecting phono circuit input capacitance to match the load capacitance of the employed cartridge. See additional description under "CARTRIDGE LOAD Switch" on Page 9.



MUTING SWITCH

Switch for reducing volume by 20dB from the VOLUME control setting. Convenient for temporarily reducing the volume when changing records or tapes, since it eliminates the need for continually readjusting the VOLUME control.

LOUDNESS SWITCH

When listening at low volume settings, set switch to ON to enhance low and high frequencies. The response of the human ear to sound differs according to loudness. This switch compensates for this effect at low volumes.

FUNCTION SWITCH

Selects desired playback program source.

PHONO 2: To play records on a turntable connected to the PHONO 2 jacks.

PHONO 1: To play records on a turntable connected to the PHONO 1 jacks.

TUNER: To listen to broadcasts with a tuner connected to the TUNER jacks.

AUX: To play a component connected to the AUX jacks.

TAPE MONITOR SWITCH

Employ for tape playback or to monitor a recording in progress.

1: Playback or monitoring of a tape deck connected to the TAPE 1 jacks.

SOURCE: Be sure to set to this position when not using the tape deck for playback.

2: Playback or monitoring of a tape deck connected to the TAPE 2 jacks.

NOTE:
When listening to records or broadcasts, be sure to set this switch to SOURCE. Sound will not be obtained from speakers if set to 1 or 2.

TAPE DUPLICATE SWITCH

Employ when using two tape decks for duplication or editing. Be sure to set to the OFF position at other times.

1 → 2: Duplication of tape from TAPE 1 (playback mode) to TAPE 2 (recording mode).

OFF: Set to this position when not using the duplication feature (this includes simultaneous recording with two tape decks and tape playback).

2 → 1: Duplication of tape from TAPE 2 (playback mode) to TAPE 1 (recording mode).

MODE SWITCH

REV: Reverses left and right channel stereo signals and reproduces them stereophonically.

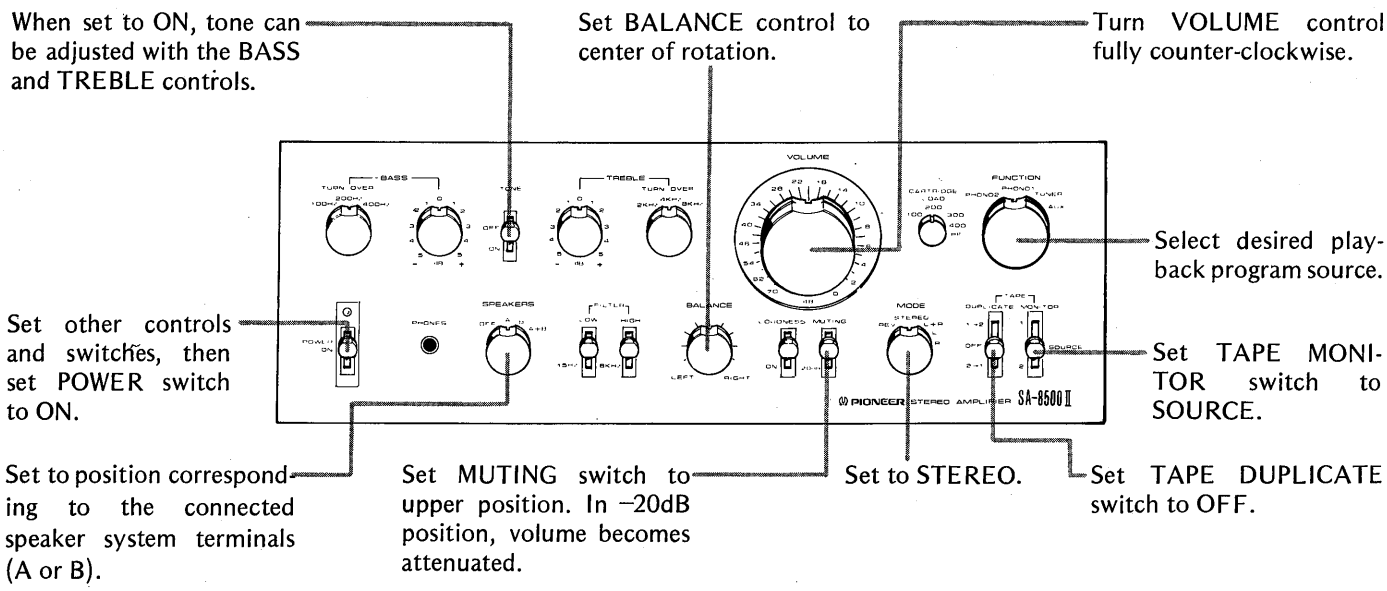
STEREO: Set to this position for normal stereo reproduction.

L + R: Mixes left and right channel signals and reproduces them monophonically.

L: Left channel signal is reproduced monophonically from both speakers.

R: Right channel signal is reproduced monophonically from both speakers.

BEFORE OPERATION


When set to ON, tone can be adjusted with the BASS and TREBLE controls.
Set BALANCE control to center of rotation.
Turn VOLUME control fully counter-clockwise.
Select desired playback program source.
Set other controls and switches, then set POWER switch to ON.
Set TAPE MONITOR switch to SOURCE.
Set to position corresponding to the connected speaker system terminals (A or B).
Set MUTING switch to upper position. In −20dB position, volume becomes attenuated.
Set to STEREO.
Set TAPE DUPLICATE switch to OFF.
PIONEER STEREO AMPLIFIER SA-8500II

OPERATION

Before Playing Records

- Noise can be reduced by setting the MUTING switch to −20dB while stylus is being lowered onto the record.
- Set LOW FILTER switch to 15Hz.
- Set CARTRIDGE LOAD switch according to capacitance specifications for the employed cartridge. These switch can also be adjusted to vary the response according to personal preferences. See further description on Page 9.
- Use care not to subject turntable to vibration while a record is being played. This can cause the stylus to jump the grooves and possibly damage the record. Also avoid turning off the power while the stylus is in contact with the record.

PLAYING RECORDS

1. Set FUNCTION switch to PHONO 1 or PHONO 2 according to the jacks to which the turntable is connected.
2. Operate turntable and play the record.
3. Set MUTING switch to upper position, then adjust VOLUME, BASS and TREBLE controls for desired volume and tone.

EMPLOYING TUNER (AM OR FM RECEPTION)

Proper antenna installation is important for best signal reception with tuner.

1. Set FUNCTION switch to TUNER.
2. Operate tuner and tune in desired station.
3. Adjust VOLUME, BASS and TREBLE controls for desired volume and tone.

PLAYING AUX COMPONENTS

An auxiliary component (tape cartridge player, TV sound tuner, etc.) can be connected to the AUX jacks and played through the stereo system.

1. Set FUNCTION switch to AUX.
2. Operate component.
3. Adjust VOLUME, BASS and TREBLE controls for desired volume and tone.

PROTECTION CIRCUIT

- After setting the POWER switch to ON, sound is not obtained from the speakers for a period of 3 to 8 seconds. This is due to the internal protection circuit which prevents noise when the power supply is activated and protects the speakers in event DC current occurs in the output.
- Loss of speaker sound or a continuous clicking noise of the internal relay during operation is most likely due to speaker terminal shorting or overload (such as occurs with less than 4ohms speaker impedance). The protection circuit functions automatically in these cases to protect the speakers and semiconductors from damage. The circuit is self-resetting and after the cause of the difficulty has been corrected, normal operation will resume.

EFFECTIVE OPERATION

PHONO CARTRIDGE LOAD SWITCH

In general, moving magnet (MM) type cartridges possess high frequency peaks as shown in Fig. 6. By varying the load capacitance (CpF), as shown in Fig. 6, the resonance frequency (peak center frequency) can be varied. Increasing the capacitance both lowers the resonance frequency and varies the peak height. Various types of high frequency characteristics can be obtained by selecting the CARTRIDGE LOAD switch position. Employ in the following manner.

When phono cartridge load capacitance is specified

Subtract turntable capacitance (stray capacitance of output cord, tonearm, etc.) from the cartridge specified capacitance and select this value with the CARTRIDGE LOAD switch.

NOTES:

- *Refer to operating instructions of employed cartridge for specified load capacitance values.*
- *Since turntable capacitance varies with output cord, wiring and other factors, a precise value cannot be definitely determined. In general, however, it can be considered to be in the range of the 100pF to 200pF. Adjust load capacitance while listening to the record.*

When not specified

Since the example in Fig. 6 shows typical high end frequency curves, adjust switch for the desired response while listening to the record playback.

TURN OVER SWITCHES

As shown in Fig. 7, the tone control system combines frequency selecting TURN OVER switches with BASS and TREBLE controls. The frequency is selected by the TURN OVER switch, then the BASS or TREBLE control is used to enhance or attenuate the frequency band above or below the point selected. For example, as shown in the figure, with the BASS TURN OVER switch at 400Hz, the low frequency region can be completely enhanced or attenuated. In some cases, this can impart an unnatural volume quality according to the program source. Setting the BASS TURN OVER switch to 200Hz or 100Hz can provide improvement in this type of case.

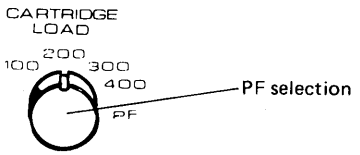


Fig. 5

Examples of frequency response variations due to pF switch settings

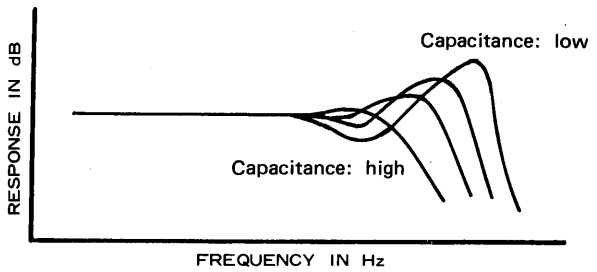


Fig. 6

Response graph — Relationships of BASS and TREBLE controls and TURN OVER switches are as shown in the graph.

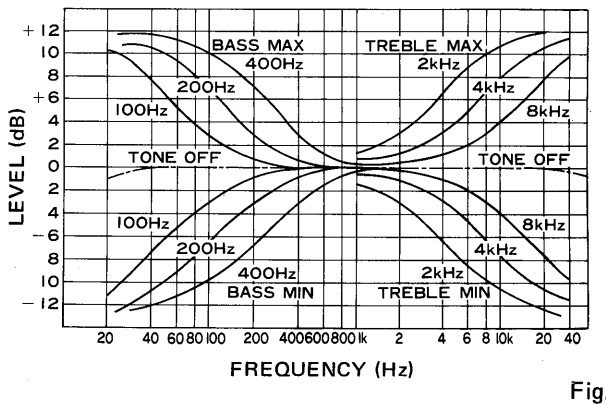


Fig. 7

VOLUME CONTROL AND MUTING SWITCH

The VOLUME control scale is directly calibrated in dB. By employing it together with the MUTING switch, the volumes (attenuations) shown in the table can be obtained. The attenuation is the sum of the VOLUME control and MUTING switch values and can be continuously varied.

- A convenient application of the MUTING switch is for temporarily reducing the volume while changing records, tapes of for other operations. This eliminates the need for continual readjustment of the VOLUME control.
- During late night listening or at other times when low volumes are used, precise adjustment becomes difficult when the VOLUME control is near the ∞ position. In these cases, it is convenient to first set the MUTING switch to −20dB, and then adjust the VOLUME control.

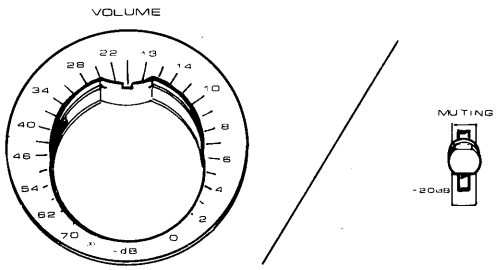


Fig. 8

0	2	4	6	8	10	14	18	20	22
24	26	28	30	34	38	40	42	46	48
54	60	62	66	70	74	82	90	∞	

Units: dB

Table 1

The VOLUME control provides continuous volume adjustment. In addition to inscribed values, intermediate values can also be obtained (Fig. 8 shows approx. −20dB).

TAPE DECK CONNECTIONS

Two sets of tape recording (TAPE 1 & 2 REC) jacks and tape playback (TAPE 1 & 2 PLAY) jacks are provided on the SA-8500II. Use tape deck accessory connecting cords to connect the jacks as follows. Upper jacks are for the left (L) channel and lower for the right (R) channel.

Recording Connections: Connect the TAPE 1 REC jacks to the recording input (LINE INPUT) jacks of the tape deck.

Playback connections: Connect TAPE 1 PLAY jacks to the playback output (LINE OUTPUT) jacks of the tape deck.

NOTE:
A second tape deck can be connected to the TAPE 2 REC & PLAY jacks in the same manner.

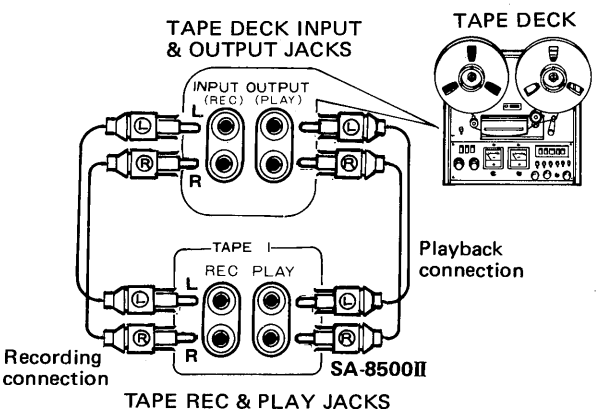


Fig. 9

Use of Record/Playback DIN Connector

If the tape deck used has a 5p DIN type socket for record/playback, connecting the tape deck to the TAPE 2 REC/PLAY socket by means of a DIN cable (purchased separately) will provide simultaneous connection for both recording and playback. If the DIN cable is used, the Pin connectors at TAPE 2 REC and PLAY jacks should be removed (See Fig. 10).

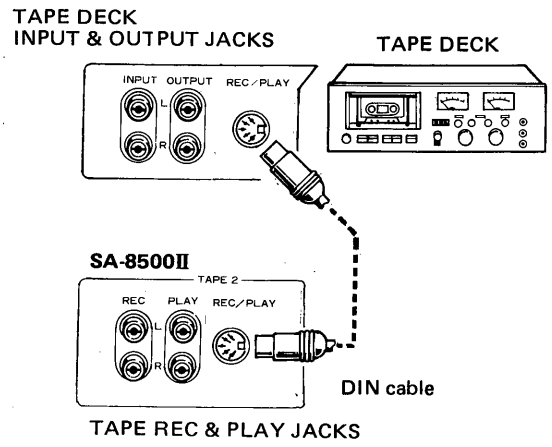


Fig. 10

USING TAPE DECK

TAPE PLAYBACK

Steps for playback of a prerecorded tape on the tape deck.

1. Set TAPE MONITOR switch to 1 if the tape deck is connected to the TAPE 1 jacks or to 2 if it is connected to the TAPE 2 jacks (see Fig. 11).
2. Operate tape deck and play tape.
3. Adjust VOLUME, BASS and TREBLE controls for the desired volume and tone.

NOTES:

1. *Be sure to return the TAPE MONITOR switch to SOURCE when not playing tape.*
2. *Tape playback is unaffected by the position of the FUNCTION switch.*

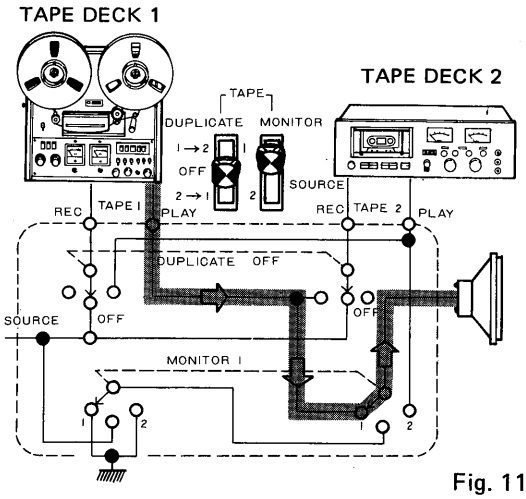


Fig. 11

TAPE RECORDING

A program source (records, FM broadcasts, etc.) can be recorded with tape deck (Fig. 12).

1. Set FUNCTION switch to the source to be recorded (PHONO, TUNER, etc.).
2. Operate program source.
3. Adjust recording levels with the controls of the tape deck and proceed with recording.

NOTE:

Channel separation will not exist during recording if the MODE switch is set to a position other than STEREO (or REV).

Monitoring Recording Conditions

If the tape deck is equipped with monitoring facilities (3 heads), recording conditions can be monitored from the speakers by setting the TAPE MONITOR switch to 1 (or 2). Both recording and playback connections must be connected in this case.

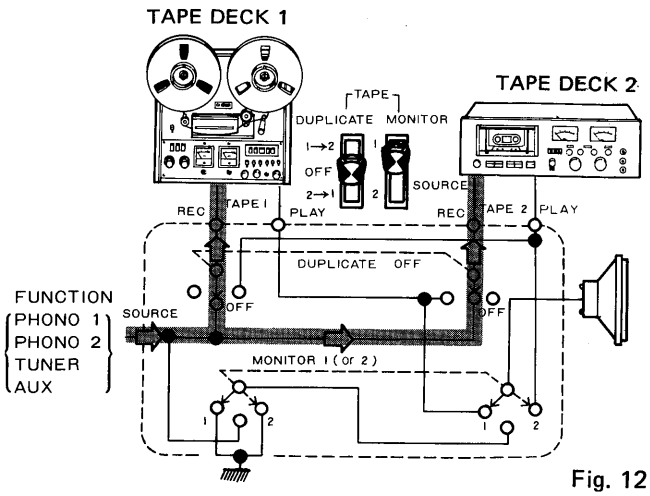


Fig. 12

TAPE DUPLICATION AND EDITING

By employing two tape decks, the desired portions only of a previously made recording can be edited onto a second tape. A personal tape library can be acquired in this manner. Duplication can also be performed between open reel and cassette tape decks.

1. Connect two tape decks as shown in Fig. 13.
2. If duplicating from TAPE 1 (playback mode) to TAPE 2 (recording mode), set the TAPE DUPLICATE switch to 1 → 2. Conversely, if duplicating in the opposite direction (from TAPE 2 to TAPE 1), set the switch to 2 → 1.

Monitoring during duplication

As shown in Fig. 13, set TAPE MONITOR switch to position of tape deck (2 or 1) in recording mode.

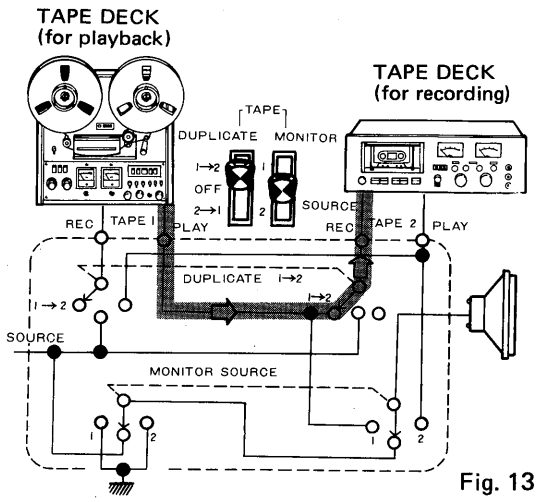


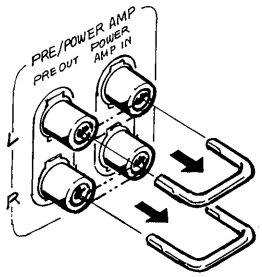
Fig. 13

NOTE:

Tape deck must be equipped with monitoring facilities (3 heads) to allow monitoring of recording conditions. If it is not so provided, acceptable results can be obtained by listening to the playback sound while recording is in progress.

EMPLOYING PRE OUT AND POWER IN JACKS

Preamplifier and power amplifier sections of the SA-8500II can be employed independently by removing the junction plugs of the PRE/POWER AMP jacks on the rear panel. During normal operation, be sure that the junction plugs are in place. Sound will not be obtained if they are removed.



JUNCTION PLUG

Fig. 14

Using Preamp Section Independently

The preamplifier circuit of the SA-8500II can be employed separately with an external power amplifier. Such operations as A-B comparison listening between built-in and external power amplifiers can then be performed.

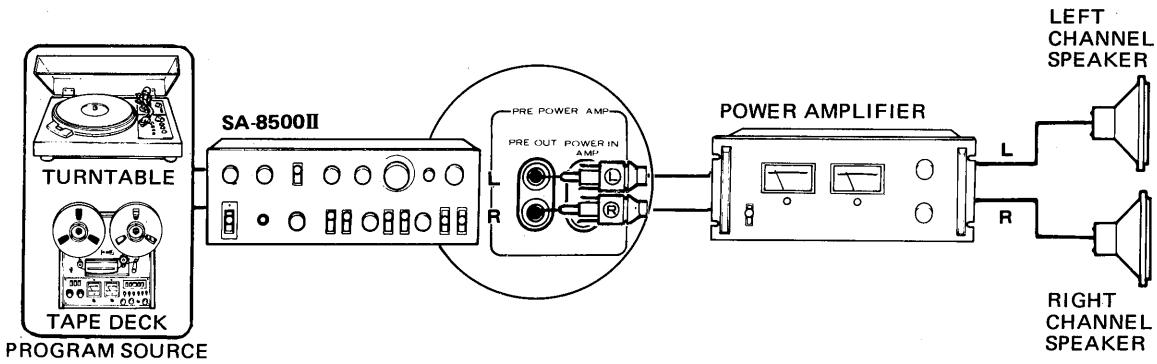


Fig. 15

Using Power Amplifier Section Independently

An external preamplifier can be connected to the SA-8500II for operation with the built-in power amplifier.

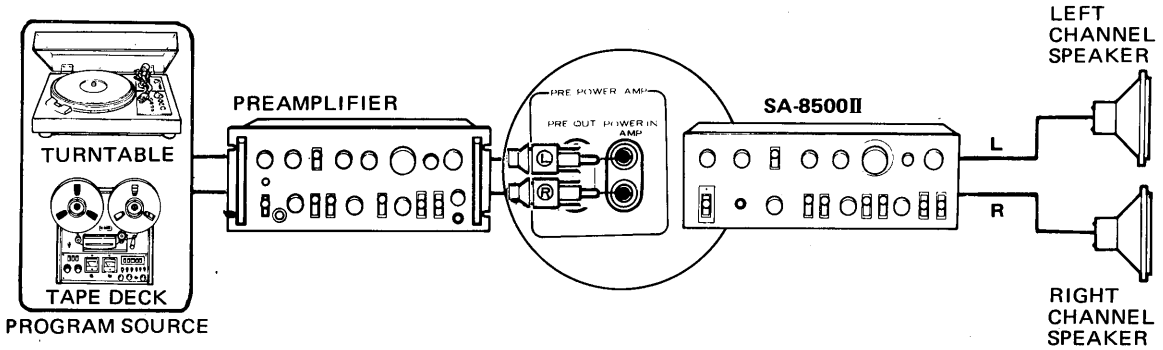


Fig. 16

Multi-amplifier System Composition

A separately sold power amplifier and electronic crossover network can be added to compose a multi-amplifier stereo system. This type of system divides the audio frequency band into sections, with each section amplified by its own power amplifier. Improved intermodulation distortion is among the benefits of this technique.

Example of 2 way multi-amplifier system composition.

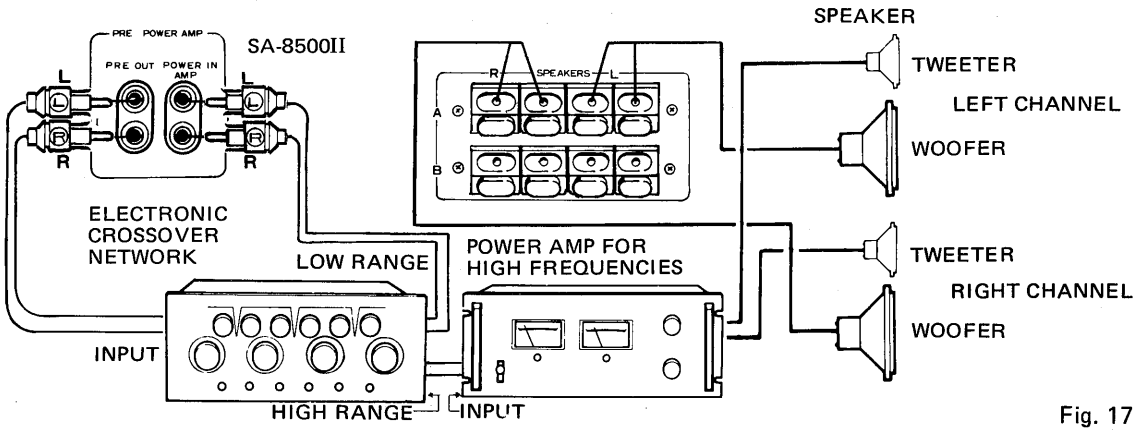


Fig. 17

CONDITIONS FREQUENTLY MISTAKEN FOR MALFUNCTION

If a malfunction is suspected, check the unit according to the following table. Also check that connected components are functioning properly. If the problem cannot be corrected, turn off the power and contact your nearest Pioneer Authorized Service Center.

Difficulty	Checkpoints	Possible Causes & Corrections
Sound not obtained	• Pilot lamp lights?	• Connect power cord properly to a live AC outlet. • Set POWER switch to ON.
	• Input & output jack connections correct and secure?	• Carefully reconnect components. (If connections are proper, check operation of connected component.)
	• PRE/POWER AMP jacks connected?	• Connect jacks with junction plugs.
	• FUNCTION switch set to program source?	• Set FUNCTION switch position according to program source.
	• Check MUTING switch & VOLUME control positions.	• Set MUTING switch to OFF and turn VOLUME control clockwise.
	• SPEAKERS switch in OFF position?	• Set switch according to the terminals to which the speakers are connected.
	• Sound not obtained immediately after turning on POWER switch.	• Normal effect due to operation of the muting circuit.
Intermittent noise	• Loose connections? (Connecting a ground lead can also be effective in reducing noise.)	• Perform connections firmly.
	• Trouble in connected component?	• Correct cause of difficulty.
Feedback howling when VOLUME is turned up.	• Turntable and speaker systems installed too close together.	• Change locations of turntable and speaker systems.
	• Turntable and/or speaker systems installed in unstable location.	• Avoid using excessively high BASS control settings.

SPECIFICATIONS

Semiconductor

Transistors 47
Diodes 29

Continuous power output of 60 watts* per channel, min. RMS, at 8 ohms or 75 watts* per channel at 4 ohms from 20 Hertz to 20,000 Hertz with no more than 0.1% total harmonic distortion.

Power Amplifier Section

Circuitry . . . . . 2-stage differential amplifier Parallel PP direct-coupled OCL.
Total Harmonic Distortion at 20Hertz to 20,000Hertz
  Continuous rated power output 0.05%
  30watts per channel power output, 8ohms 0.01%
  1watt per channel power output, 8ohms 0.01%
Intermodulation Distortion
  Continuous rated power output 0.05%
  30watts per channel power output, 8ohms 0.01%
  1watt per channel power output, 8ohms 0.01%
Frequency Response . . . . . 5Hertz to 100,000Hertz $^{+0}_{-1}$dB
Input (Sensitivity/Impedance)
  POWER AMP IN 1V/50kohms
Output . . . . . Speaker: A, B, A + B
  Headphone: Low impedance
Damping Factor (20Hertz to 20,000Hertz, 8ohms) . . . 30
Hum and Noise (IHF, short-circuited, A network) . . 110dB

Preamplifier Section

Circuitry
  Equalizer amplifier: 1st stage differential amplifier 3-stage direct-coupled A class SEPP.
  Control amplifier: 1st stage differential amplifier 2-stage direct-coupled, NFB type.
Input (Sensitivity/Impedance)
  PHONO 1 . . . . . 2.5mV/50kohms
  PHONO 2 . . . . . 2.5mV/50kohms
  CARTRIDGE LOAD . . . . . Both PHONO 1 and 2, 100, 200, 300, 400pF
  TUNER 150mV/50kohms
  AUX 150mV/50kohms
  TAPE PLAY 1 . . . . . 150mV/50kohms
  TAPE PLAY 2 . . . . . 150mV/50kohms
  TAPE PLAY 2 (DIN connector) . . . 150mV/50kohms
PHONO Overload Level (T.H.D. : 0.05%)
  PHONO 1 . . . . . 250mV (1kHz)
  PHONO 2 . . . . . 250mV (1kHz)
Output (Level/Impedance)
  TAPE REC 1 . . . . . 150mV
  TAPE REC 2 . . . . . 150mV
  TAPE REC 2 (DIN connector) 30mV/80kohms
  PRE OUT . . . . . 1V/2kohms, 6V/2kohms (Max.)

Total Harmonic Distortion
(20Hz to 20,000Hz) 0.02%
Frequency Response
PHONO (RIAA Equalization) . . . . . 20Hz to 20,000Hz ±0.2dB
TUNER, AUX, TAPE PLAY . . . . . 5Hz to 50,000Hz $^{+0}_{-1}$dB
Tone Control
BASS . . . . . ±10dB (25Hz/50Hz/100Hz)
TURN OVER frequency 100Hz/200Hz/400Hz
TREBLE . . . . . ±10dB (8kHz/16kHz/32kHz)
TURN OVER frequency 2kHz/4kHz/8kHz
Filter
LOW 15Hz (6dB/oct.)
HIGH 8kHz (6dB/oct.)
Loudness Contour
(Volume control set at −40dB position) : +6dB (100Hz)
+3dB (10kHz)
Hum and Noise
(IHF, short-circuited, A network)
PHONO 75dB
TUNER, AUX, TAPE PLAY 95dB
Muting . . . . . 0, −20dB

Miscellaneous

Power Requirements
. . . . . AC 220V, 240V (Switchable) 50/60Hz
or 110V, 120V, 220V, 240V (Switchable) 50/60Hz
Power Consumptions
. . . . . 490W Max.; 2-line voltage model only
160W;4-line voltage model only
AC Outlet . . . . . Switched; 2, Unswitched; 2
(4-line voltage model only)
Dimensions . . . . . 420(W) x 150 (H) x 376 (D) mm
16-9/16 x 5-7/8 x 14-13/16 in
Weight . . . . . Without Package: 13.9kg (30lb 10oz)
With Package: 15.8kg (34lb 13oz)

Furnished Parts

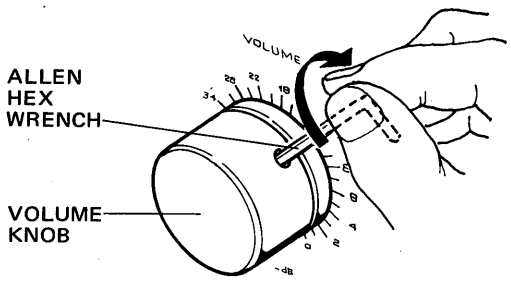
Operating Instructions 1
Connection Cord with Pin Plugs 1
Hex. Wrench (Used for fastening Volume Knob) 1
Fuses 2.5A; 1, 5A; 1
(4-line voltage model only)

* *Measured pursuant to Federal Trade Commission's Trade Regulation rule on Power Claims for Amplifier.*

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

ALLEN HEX WRENCH

The accessory Allen hex wrench is provided for removing the VOLUME knob or tightening its setscrew in event it becomes loose.
If required, loosen the setscrew by inserting the wrench into the hole on the side of the knob and turning the wrench counterclockwise. Be particularly careful not to scratch the front panel when employing the wrench.



IMPORTANT—LINE VOLTAGE

These operating instructions pertain to both 220V—240V selectable (HG) models and 110V—120V—220V—240V selectable (S) models. The LINE VOLTAGE SELECTOR switch has been set according to the local AC power line supply in the area of use. Before operating your unit, be sure to confirm that this switch has been set properly.
If necessary to change the switch setting, perform according to the steps below.

S MODELS (110V—120V—220V—240V)

1. Use Phillips screwdriver to unscrew fuse cap, then take out fuse and SELECTOR plug (Fig. A).
2. Reinstall the SELECTOR plug so that its cut out section exposes the voltage indication of the SELECTOR socket which corresponds to your household AC power line.
3. Refer to table and install replacement fuse (provided as accessory).
4. Insert fuse in fuse cap, then install cap to plug and tighten.

HG MODELS (220V—240V)

1. Use Phillips screwdriver to loosen mounting screw, then remove SELECTOR plug (See Fig. B).
2. Reinstall the SELECTOR plug with its cut out section exposing the correct voltage indication.
3. Insert and tighten mounting screw.

S model

TABLE

VOLTAGE	FUSE
110V, 120V	5 A
220V, 240V	2.5 A

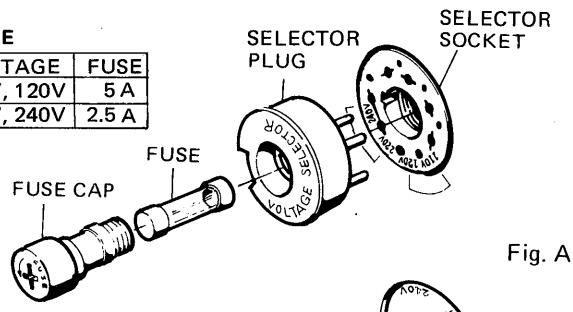


Fig. A

HG model

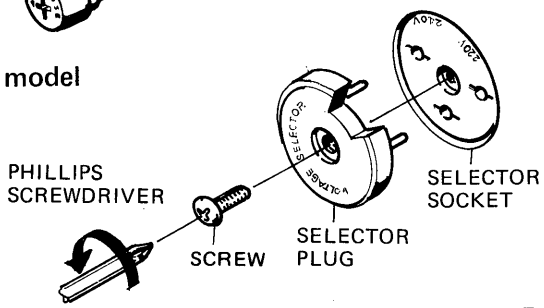


Fig. B

FOR USE IN UNITED KINGDOM OR AUSTRALIA

CAUTION 240V

Mains supply voltage is factory adjusted at 240 volts.

WARNING

THIS APPARATUS MUST BE EARTHED.

IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

Green-and-Yellow: Earth
Blue: Neutral
Brown: Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows.
The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol ⏚ or coloured green or green-and-yellow.
The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured blue or black.
The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured brown or red.
The power cord should be connected last, make sure that the power switch is off. First insert the female appliance connector of the mains cord into the AC INLET, then plug the cord to the wall socket. Be sure the appliance connector is fully inserted into the AC INLET. Unplug the set from the wall socket when it is not be used for an extended period of time.

FOR YOUR SAFETY

1. Insert this plug only into effectively earthed three-pin plug-socket outlet.
2. If any doubt exists regarding the earthing, consult a qualified electrician.
3. Extension cords, if used, must be three-core correctly wired.

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